Space Weather Forecast

Issued on Friday, 21 April 2023 at 13:07 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor Geomagnetic Storms due to CME activity, with a slight chance of Moderate Storms on 20 and 21 April. Chance of Moderate-class X-ray flares (R1-R2 Minor-Moderate radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low, with only minor Common-class flares. There are currently seven regions on the visible disc.The largest and most complex region on the disc is located in the northwest quadrant, but has been stable. A new region rotating onto the southeast limb is beginning to look more interesting, but is still too close to the limb to do a full analysis. The other regions appear to be mostly simple with some in slow decay.
However, activity near south centre disc yesterday afternoon UTC may have given rise to a 'ghost' Coronal Mass Ejection (CME). This is currently being assessed for a possible Earth directed component.

Solar Wind / Geomagnetic Activity: The solar wind showed waning weak CME effects. Wind speeds have been at ambient to slightly elevated levels, between 350-410 km/s. Total magnetic field strength was at moderate levels at first, then declined to become weak. The north-south component was moderately positive at first, becoming weakly variable. Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is expected to generally be Low, with a chance of isolated Moderate activity, mainly due to the larger region in the northwest, but perhaps also from the new region rotating onto the southeast limb.

Solar Wind / Geomagnetic Activity: A CME may arrive at Earth sometime today, or even possibly tomorrow. Confidence in the arrival time and geomagnetic effects is low. Solar wind speeds are currently at background levels The next coronal hole fast wind is likely to arrive on Days 2 or 3 (22-23 Apr), with wind speeds perhaps reaching 450-550 km/s.
Geomagnetic activity is forecast to be Quiet to Unsettled at first. Activity may increase with the potential CME arrival, becoming Unsettled to Active with a chance of G1/Minor Storms (Kp 5), and a slight chance of G2 Moderate Storm (Kp 6) intervals. This may give visible aurora over Scotland, with a slight chance of reaching Northern Ireland and Northern England. Unsettled to Active activity with a slight chance of G1/Minor Storms may be prolonged through the following days with the anticipated fast wind.

Energetic Particles / Solar Radiation: Solar radiation is currently at background levels, with just a slight chance of an increase reaching the S1/Minor Storm level or greater. This is mainly due to the risk of flaring from the larger region in the northwest of the disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	40	30	20	5
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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